Additionally, the Examiner has not returned the initialed PTO/SB/08 filed with the Information Disclosure on March 31, 2003. Applicant also requests the initialed PTO/SB/08 from the Examiner in the next response.

In regard to the claims, claims 1-6 are rejected for the first time under 35 U.S.C. § 112, second paragraph, claims 1-4 and 6 are again rejected under 35 U.S.C. § 102(b) as being anticipated by Ishihara (USP 5,946,100) and claim 5 is again rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinohara et al. (USP 6,231,200) in view of Ishihara. For the reasons set forth below, Applicant respectfully requests withdrawal of the finality of the office action and also traverses the rejections and requests favorable disposition of the Application.

Argument

Withdrawal of Finality of Office Action

Initially, Applicant respectfully requests that the Examiner withdraw the finality of the present office action since the office action introduces a new rejection under 35 U.S.C. § 112 that was not previously asserted. Specifically, "under present practice, second or any subsequent actions on the merits shall be final, except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c)with the fee set forth in 37 CFR 1.17(p)." (MPEP §706.07(a)). Here, the Examiner has introduced, for the first time, a rejection under 35 U.S.C. § 112, second paragraph. Further, the §112 rejection was not necessitated by any claim amendment(s) since no claim amendments have been made and it was not necessitated by the filing of an IDS.

Prior Art Rejection

In regard to the prior art rejections of claims 1-6, Applicant submits that the Examiner has failed to set forth a *prima facie* case of anticipation. In particular, it is clear that the Examiner is relying on the principles of inherency with regard to the single prior art reference to Ishihara. This is known since the Examiner has not even attempted to show where within the asserted prior art reference the requirements of the equation recited in claims 1, 5 and 6 are shown. Instead, the Examiner has merely asserted that the recited equation "is satisfied" by the structure disclosed in Ishihara. To support the assertion, the Examiner provided a hand-drawn figure and a hand-written "derivation" of the recited equation required by the claims.

However, the Examiner has failed to provide any explanation whatsoever regarding how the alleged derivation applies to the asserted prior art reference. In other words, the Examiner has not demonstrated that the allegedly derived equation is an absolute consequence of the structure disclosed in Ishihara. As is well settled, when an Examiner relies on a theory of inherency, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int. 1990). Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Ex parte Skinner*, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986). Here, the Examiner has failed to provide any such reasoning and, thus, the Examiner has not met his/her burden of establishing a *prima facie* case of anticipation. Moreover, the Examiner merely asserts that his/her "derivation" is born out of the "principle of the geometric optics". However, the Examiner has not provided any support at all for the derivation. In effect, the geometries used by the Examiner to purportedly derive the

equation of claim 1 do not apply to the geometries of the optical elements in Ishihara. To the extent the Examiner relies on Figs. 6 and 7 of Ishihara, Applicant respectfully requests that the Examiner demonstrate where the variables t, R and θ apply to the optical elements disclosed. Absent such a conclusive showing, the anticipation rejection is not supported and must be withdrawn.

In regard to the rejection of claim 5, because claim 5 recites the same equation as recited in claims 1-4 and 6 and, for the same reason as set forth above, the rejection of claim 5 over the combination of Shinohara et al. and Ishihara should be withdrawn as well.

§112 Rejection

In regard to the rejection of claims 1-6 under 35 U.S.C. § 112, second paragraph as well as Examiner's response to Applicant's argument that "θmin should be θmax", Applicant respectfully reminds the Examiner that the Applicant was referring to the Examiner's hand-written "derivation" and not the specification of the application at hand. Accordingly, no "proof" of the recited formula is deemed necessary. Regardless, Applicant submits that the condition applies due to Snell's Law.

However, in order to expedite prosecution of the application, Applicant provides additional information below in support of the equation recited in claims 1, 5 and 6, specifically, $Sr \geq 2t \bullet \tan\theta + R$.

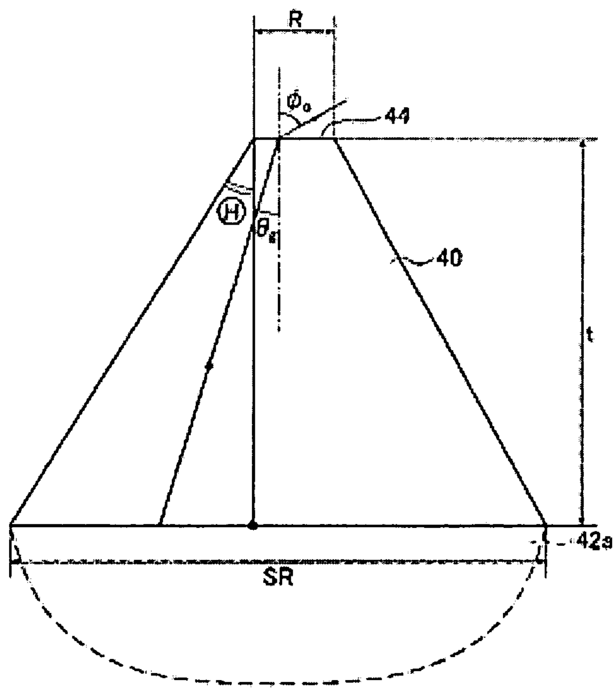
As is clear from the figures provided in the present application, specifically Fig. 4, a microlens 42a allows light to enter from anywhere on its hemisphere surface and thus does not need to have any restriction as to the light incident side. On the other hand, a light exit area (e.g., pin hole) 44 is required to efficiently diffuse the light entered through the microlens 42a and emit

the efficiently-diffused light. The efficiently-diffused light preferably has a wide range of angles formed by light emitted from the light exit area 44 on a lens substrate 40 with respect to a light exit surface of the light exit area 44 and, further, ideally diffused light at various angles within the range of 0° to 180° in particular is emitted.

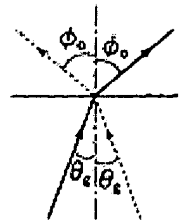
To assist in explaining the use of the equation in question, Applicant is providing below reference figures REF FIGS. 1-4 which are consistent with the figures of the present application.

REFERENCE FIGURE

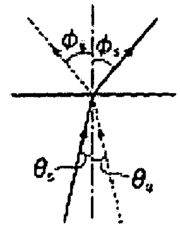
REF FIG. 1



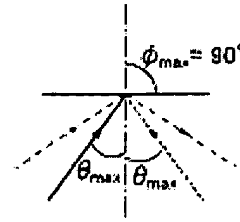
REF FIG. 2



REF FIG. 3



REF FIG. 4



Considering the light refraction at the light exit area 44 with reference to REF. FIG. 1, the light at an incident angle θ defined as θg with respect to the normal direction of the light exit surface from the lens substrate 40 having a refractive index ng is refracted at the light exit surface (boundary surface) of the lens substrate 40 and is emitted at an emitting angle Φ, defined Φ_0, with respect to the normal direction into air of the refractive index n_o ($ng>n_0$). This relation can be expressed as set forth below:

$$ng \bullet \sin\theta g = n_0 \bullet \sin\Phi_0 \qquad \text{(Snell's Law)} \qquad \ldots (1)$$

Accordingly, the light emitting angle Φ when the incident light θ is in the range of 0 to θg falls into the range of 0 to Φ_0, so that the emitted light should be diffused at angles in the range of 0 to $2\Phi_0$.

Please note that in REF. FIG. 1, SR represents the diameter of the microlens 42a, t represents the thickness of the lens substrate 40, and R represents the diameter of the light exit area 44, and the tilt angle Θ of the conical surface formed by joining the circle of the light exit area 44 and of the microlens 42a with straight lines is defined by $(Sr\text{-}R)/2t = \tan\Theta$.

As shown in REF. FIG. 3, in cases where the incident angle θ of the incident light is set to be the incident angle Θs, which is smaller than the incident angle θg shown in REF. FIG. 2, the emitting angle Φ of the emitted light would be Θs which is smaller than Φ_0, i.e., in cases where the incident angle of the incident light is in the range of 0 to θs, the diffusion range of the emitted light of 0 to $2\Phi s$ would also be smaller than 0 to $2\Phi_0$, thus decreasing the diffusion efficiency.

Furthermore, it is well known that when light advances from a material with a relatively high refractive index to a material with a relatively smaller refractive index, light at an angle larger than the critical angle will not exit its medium (i.e., the material with a high refractive index). This principle is also applied to the optical fiber technology.

In other words, the maximum value θmax of the incident angle θ where light can exit the medium (i.e., the material) can be established only when $\Phi = 90°$, as illustrated in REF. FIG. 4; this angle θmax is referred to as the critical angle.

Accordingly, as shown in REF. FIG. 4, the diffusion range of 0 to 2Φ of the emitted light becomes maximum when $\Phi = 90°$, i.e., the incident angle 0 to θ falls in the range of 0 to critical angle θmax, and the diffusion range of 0 to 2Φ of the emitted light falls into the range of 0 to 180°, resulting in the highest diffusion efficiency. To this extent, also when the incident angle 0 to θ is larger than 0 to the critical angle θmax, the diffusion range of 0 to 2Φ of the emitted light would fall into 0 to 180°. This case, however, is not preferable, since the emitting degree of the incident light as the emitted light would decrease, and thus the amount of emitted light from the light exit area 44 would decrease, meaning that the diffusion efficiency as a diffusing plate goes down.

Derived from the formula (1), above, is $ng \bullet \sin\theta gmax = n_0 \bullet \sin 90° = n_0$. With air refractive index $n_0 = 1$, the formula would result in $ng \bullet \sin\theta gmax = l$, and thus $\theta gmax = \sin\text{-}1(1/ng)$.

Here, if the incident angle $\theta \leq$ critical angle θmax, light can go out of the light exit area (pin hole) 44. On the other hand, if the incident angle $\theta \geq$ critical angle θmax, light cannot go out of the light exit area (pin hole) 44. Accordingly, it is preferable to establish the relation as the incident angle $\theta =$ critical angle θmax.

Thus, as can be seen from REF. FIG. 1, the incident angle θ can be anything smaller than the tilt angle Θ of the conical surface formed by joining the circle of the light exit area 44 and of the microlens 42a in the figure. Further, the tilt angle Θ can be recognized as the maximum incident angle. Therefore, it is idealistic to have the tilt angle Θ =critical angle θmax, i.e., (Sr-R)/2t=tan Θ =tanθmax, with proviso that, θmax=sin-1(1/ng). In short, Sr=2t•tanθmax+R is almost the ideal relation (see page 22, line 1 to page. 24, line 4 from the bottom in the present specification).

However, in consideration of stray light (e.g., flare), the angle should be slightly larger, and thus the present invention recites, Sr $\geq$ 2t•tanθmax+R (with the proviso that θmax=sin-1(1/ng)) (see page 24, line 3 from the bottom to page 25, line 9).

The equation, Sr $\geq$ 2t•tanθ+R (with, the proviso that θ=sin-1(1/ng)) of claims 1, 5 and 6 was derived as described above.

From the above discussion, the boundary incident angle θ of light to be emitted outside has to be the maximum incident angle, that is, the critical angle θmax.

Accordingly, insofar as the Examiner's hand-written formula on the attached sheet of the office action involves the incident angle θgmin, its derivation is clearly different from that of the equation, Sr $\geq$ 2t•tanθ+R (with the proviso that θ=sin-1(1/ng)) of claims 1, 5 and 6 of the present application.

In view of the above discussion regarding the equation explicitly recited in independent claims 1, 5 and 6, Applicant maintains that Ishihara fails to teach or otherwise suggest, either alone or in combination with Shinohara et al., the subject matter in claims 1-6. Accordingly, the rejection of claims 1-6 should be withdrawn.

Conclusion

In view of the foregoing remarks, the application is believed to be in form for immediate allowance with claims 1-6, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to **contact the undersigned** at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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